

fibrosis patients using intraoesophageal pH monitoring is prevented by ethical considerations, but in a small study of 10 newly diagnosed infants with cystic fibrosis, Dab and Malfroot found significant gastro-oesophageal reflux in all 10.⁴ These authors suggest that as reflux was documented even in those patients without respiratory symptoms it could not be blamed on chronic cough, and may even represent a primary defect of oesophageal motility in cystic fibrosis. Published data about oesophageal motility in cystic fibrosis are scanty, but there is some evidence that transient relaxations of the lower oesophageal sphincter, which are not accompanied by oesophageal peristalsis, and therefore deemed inappropriate, are commoner in cystic fibrosis patients with gastro-oesophageal reflux than in reflux patients without cystic fibrosis (data presented by F Santamaria *et al* at the 10th International Cystic Fibrosis Congress in Sydney, 1988).

The importance of coughing and physiotherapy in inducing reflux in cystic fibrosis is probably underestimated. The statement by Professor Simpson and Dr Hampton that 'although large swings in intrapleural pressure induced by respiratory efforts have been thought to favour increased gastro-oesophageal reflux, there is little evidence that this actually occurs . . .' may not be true in cystic fibrosis patients. From our knowledge of the pathophysiology of gastro-oesophageal reflux, forced expiration and coughing undertaken during chest physiotherapy may cause a rise in the thoracoabdominal pressure gradient sufficient to overcome the antireflux barrier of the lower oesophageal sphincter, and the antigavity effect of postural drainage in the 'head down' position would also be expected to exacerbate reflux. In a study in 10 young patients¹ with cystic fibrosis investigated with 24 hour oesophageal pH monitoring during which all underwent three periods of chest physiotherapy, eight were found to have pathological reflux, and in six physiotherapy provoked reflux.⁵ Although in my experience

intraoesophageal pH monitoring is not well tolerated by patients with cystic fibrosis with established pulmonary disease, this is an area which merits further study.

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Paracetamol suppositories after cardiac surgery

SIR,—We read with interest the article by Hopkins, Underhill, and Booker concerning rectal absorption of paracetamol.¹ We have performed a similar study on 20 children, mean age 3.75 years (range 0.28–10.58 years), giving paracetamol suppositories (Macarthys Laboratories Ltd) when they became feverish, four to six hours after the cessation of cardiopulmonary bypass (11–14 mg/kg body weight). Rectal temperature was monitored continually and plasma paracetamol concentrations were measured every hour for four hours.

The minimum therapeutic plasma paracetamol concentration for an antipyretic effect is

66 $\mu\text{mol/l}$.^{1,2} In 18 of our 20 patients the paracetamol concentration never exceeded 25 $\mu\text{mol/l}$ (the lower limit of detection in our assay) and reached only 35 and 29 $\mu\text{mol/l}$ (at two hours) in the remaining two patients. In 10, K-Y Lubricating Jelly (Johnson and Johnson) was used to aid insertion of the suppositories, but this did not effect absorption. There was no fall in rectal temperature over the four hour period.

We analysed the batch of suppositories and found an acceptable 92% bioavailability. As doses of 10 mg/kg have been shown to reduce temperature in preoperative children,³ we suggest that the poor absorption must be due to patient factors, such as an ileus or interference from anaesthetic drugs. The study by Hopkins *et al* would support this.¹ Although similar doses were used, the plasma paracetamol concentrations were higher (albeit subtherapeutic). As the suppositories were given much later (24 hours after operation), it suggests that the effects of some drug or unknown factor could be wearing off. It would be interesting to re-examine these patients one week later. Whether poor rectal absorption is specific to cardiac surgery and whether other drugs are similarly affected, is uncertain, but needs careful evaluation.

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